Priorities for Future *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*

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The International Agency for Research on Cancer (IARC) selects chemicals, groups of chemicals, mixtures, physical and biological agents, and exposure circumstances for evaluation in its series *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans* on the basis of advice given to them by international groups of scientists. To date, 58 volumes of monographs have been published, providing evluations of 770 agents and exposure circumstances.

The fourth group to select priorities met at IARC in Lyon 7–9 December 1993 to discuss lists of agents and exposures that had been proposed by some 150 scientists at major national cancer research centers and at other national and international institutions and to recommend whether they should be given high or low priority for consideration or reconsideration within monographs planned for 1995–2000 or whether they should be deleted from the lists. The suggestions were classified loosely as occupational exposures/industries, physical factors, industrial chemicals, fibers, medical treatments, pesticides, food additives and contaminants, naturally occurring substances, environmental contaminants, and biological agents. The lists were supplemented by priority data sheets that had been completed for each agent or exposure by the person nominating it for consideration. The sheets contained the CAS number and formula of the agent (if applicable), whether the evaluation would be a new one or a re-evaluation, and a brief justification for the nomination. In all 267 nominations were considered. The high and low priorities accorded by the working group to various agents and exposure circumstances are shown in Table 1.

The group proposed grouping certain agents to reflect particular chemical classes, such as aldehydes, nitrotoluenes, chlorophenoxy herbicides, dithiocarbamates and the class of fungicides that includes folpet, captan, and phosmet; sucrose, lactose, and other disaccharides; artificial sweeteners; and antioxidants. The group also recommended that IARC organize meetings or workshops to attempt to summarize current knowledge on the relevance of generic mechanism of action to carcinogenic risk to humans, before evaluating evidence for the carcinogenicity of individual agents that may act by the mechanism in question. Examples of such mechanisms are peroxisome proliferation, particle carcinogenesis, and thyrostatic effects.

The group also recommended that IARC organize meetings or workshops on the effects on cancer occurrence of diet and of sexual and reproductive behavior. Although certain components of diet might be amenable to consideration within the structure of the monographs, it was considered that elements such as fat and caloric intake were not. These issues could be addressed by the agency's Scientific Publications series.

The working groups that evaluate agents and exposures for carcinogenicity refer for biological and epidemiological data only to primary reports that have been published in the openly available scientific literature or to primary information that is in the public domain, such as government reports that have undergone peer review and are widely available. The purpose of this restriction is to make it possible for readers of the monographs to verify the information and conclusions, thus ensuring the transparency of the evaluations in the monographs.

Many of the priorities listed above can be incorporated into plans for monographs in 1995–2000; for some of those given low priority, however, inclusion depends to a large extent on the availability of published data. A plea is therefore made that anyone involved in studies that are planned, in progress, or already completed ensure that the results are published in the scientific literature as rapidly as possible. A large body of both positive and negative information exists on several of the agents listed that have been accorded high priority for evaluation. It is hoped that any additional data will be made available in a suitably published form in time for meetings at which the agents and exposures are scheduled for evaluation. The full report of the meeting was published as IARC Internal Report no. 93/005 and is available upon request.

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Table 1. Agents and exposures accorded high and low priority for consideration within the *IARC Monographs* series

Agent or exposure	Priority
Occupational exposures/industries	
Agricultural workers	High
Aluminum production[a]	High
Dry cleaners using tri- and/or tetrachloroethylene[a]	High
Electrical workers	High
Leather goods manufacture[a]	High
Pulp and paper manufacture[a]	High
Printing and printing inks	High
Rubber industry[a]	High
Butchers and meat workers	Low
Chemists and other laboratory workers	Low
Chimney sweeps	Low
Cooks, professional	Low
Electronics industry	Low
Petroleum refining[a]	Low
Physical factors	
Electric and magnetic fields	High
Industrial chemicals	
Acrolein[a]	High
Bitumens[a]	High
Carbon blacks[a]	High
3-Chloro-2-methylpropene	High
4-Chloro-*o*-toluidine	High
5-Chloro-*o*-toluidine	High
Crotonaldehyde	High
2,3-Dibromo-1-propanol	High
1,3-Dichloro-2-propanol	High
2,4- and 2,6-Dinitrotoluenes	High
1,2-Diphenylhydrazine	High
2,3-Epoxy-1-propanol	High
Formaldehyde[a]	High
Glycol ethers	High
Lead, inorganic[a]	High
Methyl-*tert*-butyl ether	High
Monochlorobenzene	High
Nitrobenzene	High
N-Nitrosodiethanolamine[a]	High
Nitrotoluenes	High
Polybrominated flame retardants and contaminants	High
Polychlorinated dibenzo-*p*-dioxins and dibenzofurans[a]	High
Tetrahydrofuran	High
Tetranitromethane	High
o-Toluidine[a]	High
1,1,1-Trichlorethane	High
Trichloroethylene[a]	High
2,4,6-Trinitrotoluene	High
Tris(2-chloroethyl)phosphate[a]	High
Vinyl fluoride[a]	High
Acetamide[a]	Low
Acrylic acid[a]	Low
3-Amino-9-ethylcarbazole hydrochloride	Low
4-Amino-3-fluorophenol	Low
Aniline[a]	Low
Bis(2-chloroethyl)ether[a]	Low
Boric acid	Low
tert-Butyl hydroquinone	Low
Carbon disulfide	Low
Chlorofluorocarbons	Low
N-Chloroformyl morpholine	Low
1-Chloro-2-nitrobenzene	Low
1-Chloro-4-nitrobenzene	Low
Chrysoidine[a]	Low
CI Direct Blue 218	Low
Cutting fluids, synthetic	Low
3,3'-Diaminobenzene	Low
Dimethyl methyl phosphonate	Low
Dintrobenzenes	Low
Ethanol[a]	Low
Ethyl benzene	Low
Ethylene glycol	Low
Gallium compounds	Low
Gasoline[a]	Low
Glutaraldehyde	Low
Glycidyl trimethylammonium chloride	Low
Hexachloroethane[a]	Low
Hydrogen peroxide[a]	Low
Indium phosphate	Low
2-Mercaptobenzothiazole	Low
Methyl carbamate[a]	Low
4-Methylquinoline	Low
1-Naphthylamine[a]	Low
Perfluorooctanoic acid and ammonium perfluorooctanoate	Low
o-, *m-*, *p*-Phenylenediamines[a]	Low
Quinoline	Low
Rhodamine 6G[a]	Low
Titanium dioxide[a]	Low
Titanocene dichloride	Low
2,4- and 2,6-Toluene diisocyanates[a]	Low
m-Toluidine	Low
p-Toluidine	Low
1,3,5-Triglycidyl isocyanurate	Low
Fibers	
Asbestos[a]	High
Man-made mineral fibers[a]	High
Silica[a]	High
Medical treatments	
Anthraquinones (1-Hydroxyanthraquinone)	High
Benzodiazepines[a]	High
Benzoyl peroxide[a]	High
Chloral hydrate	High
5-Fluorouracil[a]	High
Iodine-131	High
Nucleoside analogs (AZT, DDI)	High
Oral contraceptives (estroprogestins)[a]	High
Tamoxifen	High
Triamterene	High
Vitamin K (by injection in neonates)	High
Amphetamines	Low
Antidepressants (amitryptilline, fluoxtine)	Low
Carbadox	Low
Coumarin	Low
Doxylamine succinate	Low
Gentian violet	Low
6-Mercaptopurine[a]	Low
8-Methoxypsoralen[a]	Low
Omeprazole	Low
Phenobarbital[a]	Low
Tolbutamide	Low
Urocanic acid	Low
Pesticides	
Alachlor	High
Benomyl	High
3-Chloro-2-methylpropene	High
p,p-DDT[a]	High
2,4-D and other chlorphenoxy compounds[a]	High
Ethylene and propylene bis(dithiocarbamates)	High
Folpet	High
Hexachlorobenzene[a]	High
Captan[a]	Low
Chinomethionat	Low
Crotoxyphos	Low
Glyphosate	Low
Isoproturon	Low
Linuron	Low
Malathion	Low
Monuron TCA	Low
Paraquat and diquat	Low
Phosmet	Low
Propazine	Low
Propiconazole	Low
Tecnazene	Low
Triadimefon	Low
Vinclozin	Low
Food additives and contaminants	
Aspartame	High
Butylated hydroxytoluene[a]	High
Saccharin[a]	High
Sugar substitutes such as lactitol	High
trans-Anethole	Low
Fast Green FCF[a]	Low
Musk xylol	Low
Propyl gallate	Low
Naturally occurring substances	
Betel quid (without tobacco)[a]	High
Caffeine and caffeine-containing beverages[a]	High
Fusarium toxins[a]	High
Naphthalene	High
Nitrates	High
Nitrites	High
3-Nitroso(methylamino)propionaldehyde[a]	High
3-Nitroso(methylamino)propionitrile[a]	High
4-Nitroso(methylamino)-1-(3-pyridyl)-1-butanol[a]	High
4-Nitroso(methylamino)-1-(3-pyridyl)-1-butanone[a]	High
N'-Nitrosonornicotine[a]	High
Ozone	High
Phomopsin A	High
Protein thermolysis products	High
Quercitina	High
Sucrose and its thermolysis products	High
Agaritine[a]	Low
Benzyl acetate[a]	Low
Capasaicin	Low
Cholesterol, dietary[a]	Low
Ethanol[a]	Low
Malonaldehyde	Low
Myristicin	Low
Pyrolizidine alkaloids	Low
Tannins and tannic acid[a]	Low
Environmental contaminants	
Air pollution	High
Benzo[*a*]pyrene[a]	High
Environmental tobacco smoke	High
Halogenated by-products in water	High
Wastes, solid and hazardous	High
Carbazole[a]	Low
Chrysene[a]	Low
3,7-Dinitrofluoranthene[a]	Low
3,9-Dinitrofluoranthene[a]	Low
Fly ash	Low
9-Methylcarbazole	Low
1-Methylnaphthalene	Low
4-Methylquinoline	Low
Pyrene[a]	Low
Biological agents	
Epstein–Barr virus	High
Human immunodeficiency virus	High
Human papilloma virus	High
Human T-cell leukemia virus type 1	High
Herpes simplex virus	High

[a]Reevaluation.